



Sentinel GPS Inc. is dedicated to producing environmentally sustainable products. The enclosed product complies with RoHS Directive (2002/95/EC) that restricts the use of 6 hazardous substances such as mercury, cadmium and lead.

Support:

www.growgps.com/support | support@growgps.com

3 YEAR LIMITED WARRANTY

Sentinel Global Product Solutions Inc doing business as Sentinel, Sentinel Technologies, Global Product Solutions (collectively SGPS) warrants that for a period of three years from the date of purchase, this product will be free from defects in material and workmanship. SGPS, at its option, will repair or replace this product or any component of the product found to be defective during the warranty period. Replacement will be made with a new or remanufactured product or component. If the product is no longer available, replacement may be made with a similar product of equal or greater value. This is your exclusive warranty. DO NOT attempt to repair or adjust any electrical or mechanical malfunctions on this product. Doing so will void this warranty and may cause serious injury/death/damage.

This warranty is valid for the original retail purchaser from the date of the initial retail purchase and is not transferable. Keep the original sales receipt. Proof of purchase is required to obtain warranty performance. SGPS dealers, distributors, service centers and retail outlets selling SGPS products do not have any right to alter, modify or in any way change the terms and conditions of this warranty.

This warranty does not cover normal wear of parts or damage resulting from the following: negligent use or misuse of the product, use on improper voltage or current, use contrary to the operating instructions, use contrary to any and all applicable local, state, provincial or federal laws, disassembly, repair or alteration by anyone other than SGPS or an SGPS authorized service center. Further, the warranty does not cover: Acts of God, such as fire, flood, hurricanes, tornadoes; nor Acts of War or Acts of Terrorism.

What are the limits on SGPS's liability?

SGPS shall not be liable for any incidental or consequential damages cause by the breach of any express, implied or statutory warranty or condition.

Except to the extent prohibited by applicable law, any implied warranty or condition of merchantability or fitness for a particular purpose is limited in duration to the duration of the above warranty.

SGPS disclaims all other warranties, conditions or representations, express, implied, statutory or otherwise.

SGPS shall not be liable for any damages of any kind resulting from the purchase, use or misuse of, or inability to use the product including incidental, special, consequential or similar damages or losses of profits, or for any breach of contract, fundamental or otherwise, or for any claim brought against the purchaser by any other party.

Some provinces, states or jurisdictions do not allow exclusion or limitation of incidental or consequential damages or limitations on how long an implied warranty lasts, so the above limitations or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights that vary from province to province, state to state or jurisdiction to jurisdiction.

In the USA and Canada, this warranty is offered by Sentinel Global Product Solutions Inc. If you have any other problem or claim in connection with this product, please write our Consumer Service Headquarters:

Sentinel GPS, 422 Larkfield Center PMB 281, Santa Rosa, CA 95403 USA.

Please do not return this product to this address, as the product will be refused for delivery.



Sentinel Global Product Solutions Inc. | www.growgps.com

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CHHC-4i | CO2 PPM, Humidity, Heating, Cooling with S.I.C.E.™ Intelligence



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IMPORTANT WARNINGS AND CAUTIONS

Read all instructions before installation and usage.
Save these instructions.

IMPORTANT: The remote probe contains sensitive electronic componentry. Protect from spraying, splashing, misting, foggers, sulfur vapors, pesticides, fungicides, cleaning solutions. Probe assembly should be covered or removed prior if the possibility of any of these occurring exists. Damage from these occurrences is NOT covered under warranty.

Protect probe from impacts and jarring.

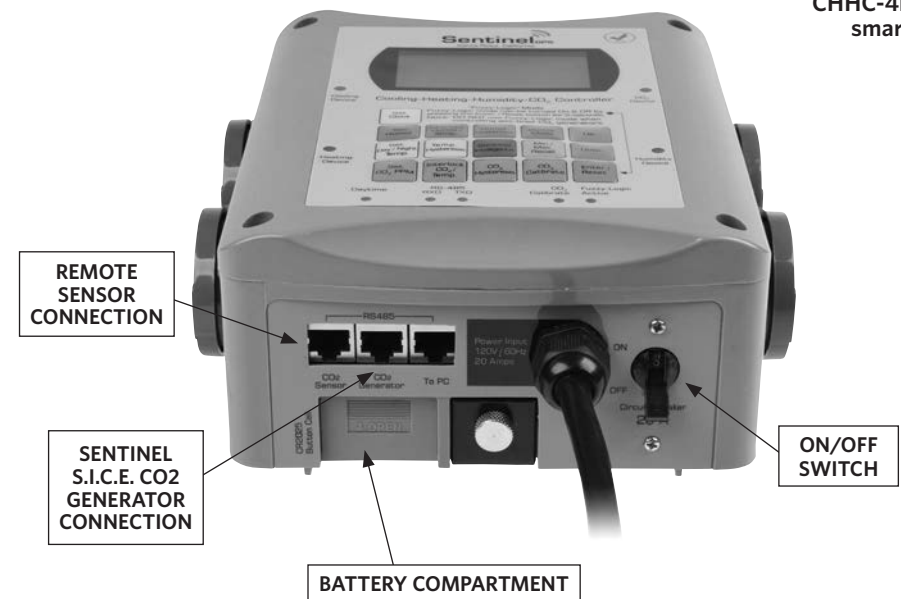
Any damage to probe will be considered improper usage or user neglect and void any and all warranties.

- Never exceed recommended amperage
- Verify power source prior to connecting unit to power source
- Make sure unit is securely mounted
- Do not mount unit near heat generating sources
- This unit shall not be exposed to dripping, splashing or spraying of liquids. Protect unit from vapors, foggers etc.
- Clean unit with clean dry cloth, no oils or solvents.
- Protect any power cords from being walked on, pinched or crushed.
- Unit is designed for indoor use only
- Unit is to be used within defined environmental parameters
- Use caution when operating in high humidity environments
- This unit contains no user-serviceable parts. Do not attempt to service this product.
- Verify that all equipment connected to unit is of proper voltage
- Do not put paperclips, tools etc inside unit openings or receptacles. Possible fire, shock or death may occur.

GETTING TO KNOW YOUR CHHC-4i



Scan this code to learn more about the Sentinel CHHC-4i on your smart phone!



INITIAL INSTALLATION INSTRUCTIONS

1. Open battery compartment located on bottom of unit. Remove the plastic protection tab from underneath the battery. Replace battery compartment cover.
2. Mount supplied bracket to wall
3. Slide unit onto bracket
4. Secure unit to bracket with supplied set screws
5. Connect one end of supplied S.I.C.E. shielded communications cable to unit. Route cable as needed. Connect other end of S.I.C.E. cable to the remote sensor in the desired location.

S.I.C.E. shielded communications cables are available from your preferred retailer, or from www.growgps.com/store. Sentinel S.I.C.E shielded communications cables are available in 5 meter (part# SICEcb15), 10 meter (part# SICEcb110), 25 meter (part# SICEcb125), and 50 meter (part# SICEcb150) lengths.

These are NOT standard Ethernet cables. They are shielded to reduce interference coming from digital ballasts, and are specially coated to not allow moisture inside. The use of standard Ethernet cables is NOT recommended, and any harm that comes from the use of non-Sentinel approved cables VOIDS any and all warranties. The special coatings on these cables makes them less-flexible than standard Ethernet cables. They are not intended to be highly flexible. It is recommended after installation that the cables are affixed securely to the walls or ceilings of your greenhouse or grow room in a manner that makes sure the cables are not pinched or crushed.

While every effort has been made to shield your CHHC-4i from EMI (Electromagnetic Interference) it is still not recommended to place your CHHC-4i main unit, probes and cables to close to electronic or digital ballasts. It is not recommended to run the S.I.C.E. cables in electrical raceways with digital ballast lamp cords.

6. Make sure power switch is in the "OFF" position. Connect power cable to unit.
7. Plug power cable into appropriate receptacle. A timer or other device should not be used.
8. Turn power switch to the "ON" position
9. Upon initial power up, and subsequent re-starts, the unit will take 2-5 minutes to warm up, stabilize the CO2 sensor and begin operation. This is normal.
10. Set the current time. This is done by pressing and holding the "Set Clock" button for 5 seconds. Make sure to press the enter button after every value to save the settings into memory.
11. Set the CO2 on / off time. This is done by simultaneously pressing the "Set Clock" and "Set CO2 PPM" buttons and holding for 5 seconds. The CO2 ON time should coincide with the lights ON cycle or daytime. The CO2 OFF time should coincide with the lights OFF cycle or night time. Make sure to press the enter button after every value to save the settings into memory.

For 24 hour ON light cycles, set the CO2 ON AND OFF times to 10:00 and 10:00. This will allow for continuous CO2 control and enrichment.

TIP: Some universities have suggested that CO2 levels be enriched 20-30 minutes after lights have turned ON. This allows plant's stomata to open and the plant to begin respiration prior to CO2 enrichment. CO2 can also be turned OFF 20-30 minutes (even more) prior to the lights actually turning off. This allows the garden to use up the elevated CO levels prior the dark period. Both of these are possible with the Sentinel CHHC-4i. Individual greenhouses and gardens will vary. Please proceed at your own risk/discretion.

12. Set the day and night times for the temperature and humidity. This is done by simultaneously pressing the "Set Clock" and "Set Humid" buttons and holding for 5 seconds. The temperature/humidity "Day" time should coincide with the lights ON cycle or (daytime in a greenhouse). The temperature/humidity "Night" time should coincide with the lights OFF cycle (or night time in a greenhouse). Make sure to press the enter button after every value to save the settings into memory.

For 24 hour ON light cycles, set the temperature/humidity Day AND Night times to 10:00 and 10:00. This will allow for continuous CO2 control and enrichment.

13. **After programming all time settings, turn the CHHC-4i off and restart the unit. This will clear the time clock cache and make sure the unit is operating on the proper time schedules for all functions. This is required in the future after changing the time settings of any parameters.**

SENTINEL INTELLIGENT CO2 ENRICHMENT (S.I.C.E.)

Your new Sentinel CHHC-4i is the most advanced CO2 controller available on the market today. It incorporates the proprietary S.I.C.E. - Sentinel Intelligent CO2 Enrichment - communication and control components and programming that are unique to Sentinel. This patent pending system allows for communications between Sentinel S.I.C.E series products, providing a level of control never before seen in your greenhouse, garden or grow room.

The system works by a Sentinel S.I.C.E. series controller, such as the Sentinel CHHC-4i, measuring and monitoring your growing environment. As the atmospheric CO2 levels change, the controller will tell the Sentinel ICG series generator to increase output, decrease output, or go into idle mode...all computer controlled. In this way, a growing environment that has very low Co2 levels, such as the start of the day or after a ventilation cycle, can be rapidly brought back up to optimal growing conditions. As the optimal conditions are reached, the S.I.C.E. system can decrease CO2 output, making sure that the user defined optimal level is not overshoot. As needed, the growing environment can be "topped off" with CO2 enrichment on a lower output setting, allowing for air conditioners and dehumidifiers to better deal with the heat and moisture loads associated with CO2 enrichment and maintaining more constant temperature and rH levels.

1. Follow initial installation instructions for Sentinel CHHC-4i and Sentinel ICG Series generator.
2. Connect CHHC-4i to ICG-30 with Sentinel S.I.C.E. cable of appropriate length. (Cables available separately).
3. Set the desired CO2 levels for the S.I.C.E. control with the "Sentinel Intelligence" button. Mode 1 is the "High" setting for the CO2 generator, meaning full output. Mode 2 is the "Medium" setting for the CO2 generator, meaning 2/3rds output. Mode 3 is the "Low" setting for the CO2 generator, meaning 1/3rds output. Make sure to press the "Enter" button after each value.

It is important to note that since all growing areas are different, settings for the S.I.C.E. control will have to be tailored to each environment for optimal function.

Sentinel Standard CO2 Generator Function

While the Sentinel CHHC-4i has been designed with advanced communication and control componentry for ideal operation using the proprietary S.I.C.E. system, the CHHC-4i can work with any current and previous Sentinel brand CO2 generators as well as other manufacturer offerings. And the best part is you can always upgrade to a Sentinel ICG series S.I.C.E. generator in the future!

1. Follow initial installation instructions for your Sentinel CHHC-4i and for your Sentinel VCG series generator or other brand CO2 generator.
2. Set desired CO2 enrichment level with the "Set CO2 button". Make sure to press "Enter" after the desired level is set.
3. Make sure the CHHC-4i is set to CO2 Generator Mode. This is accomplished by pressing and holding the "Enter" button for 5 seconds. Using the Up/Down buttons put the CHHC-4i in Generator mode. Press the ENTER button to confirm your selection.
4. Plug the power supply for the CO2 generator into the CO2 Device receptacle.
5. If you notice the CO2 levels are exceeding your set point, use a lower power setting on the CO2 generator.
6. If you notice the CO2 generator is cycling on and off too frequently, increase the hysteresis using the "CO2 Hysteresis" button.

Sentinel "True Fuzzy Logic" CO2 Operation for bottled CO2

The Sentinel CHHC-4i has been designed with the most advanced "True Fuzzy Logic" programming and componentry for optimal use with CO2 regulator / bottled CO2 pairings. While many CO2 brands claim to use fuzzy logic, they are really using a less advance PID control loop design. Sentinel "True Fuzzy Logic" ensures the most precise control and enrichment levels available to bottled CO2 regulator users.

For best results, Sentinel recommends using the highest quality Sentinel CO2-REG components.

1. Follow initial installation instructions for Sentinel CHHC-4i and Sentinel CO2-REG or other brand CO2 regulator.
2. Set desired CO2 enrichment level with the "Set CO2 button". Make sure to press "Enter" after the desired level is set.
3. Make sure the CHHC-4i is set to "True Fuzzy Logic" mode. This is accomplished by pressing and holding the "Enter" button for 5 seconds. Using the Up/Down buttons, put the CHHC-4i in Fuzzy Logic mode. Press the enter button to confirm your selection.
4. Plug the power supply for the CO2 regulator into the CO2 Device receptacle.
5. If you notice the CO2 levels are exceeding your set point, use a lower output flowrate setting on the CO2 regulator.

Temperature Control Settings

The CHHC-4i can control both heating and cooling equipment with separate Day and Night settings for each device. Please exercise care to have the temperature settings for your heating and cooling devices staggered appropriately so they do not run simultaneously.

Humidity Control Settings

1. The CHHC-4i can operate in EITHER rH decrease (dehumidification) or rH increase (humidification) modes. Select which mode is desired by pressing the "Humid Mode" button. Use the Up/Down buttons to scroll between the options. Press the enter button to confirm your selection and save it to memory.
2. Separate humidity set points are available for day time and night time. Press the "Set Humid" button. Select the desired day rH set point. Press the "Enter" button to confirm and save your setting. The screen will automatically change to the night humidity set point. Select the desired night rH set point. Press the "Enter" button to confirm and save your selection.
3. Use the "Humid Hysteresis" settings to increase or decrease the frequency of your humidification equipment operation.
4. Usually, gardens have separate temperature and humidity control methods. For gardens or greenhouses where temperature and humidity control are both achieved using a common exhaust fan, place the CHHC-4i into humidity/temperature interlock mode. Press the "Interlock Humid/Temp" button. Scroll through the settings to "Connect". Press the "Enter" button to confirm and save your setting to memory.

GENERAL MAINTENANCE PROCEDURES

For optimal continued operation of your CHHC-4i, several general maintenance procedures are required on a periodic basis.

Recalibration of the CO2 sensor:

Recalibration of CO2 sensor is required at 12 month intervals, after the probe being jarred/ sustaining rough handling, or other times if CO2 levels do not appear to be reading accurately. Recalibration of the CO2 sensor is a fairly simple process, provided that basic protocols are followed:

1. Move the remote sensor to an area outside of the garden or greenhouse that is in fresh air - preferably outdoors. The sensor must be away from people and other CO2 generation sources. Protect unit from direct sunlight.
2. Turn the power on to the CHHC-4i. Allow the unit to operate undisturbed for a minimum of 30 minutes with a time of 1+ hours being optimal.
3. Press the CO2 Calibrate button on the main controller. Set the desired ambient (baseline) CO2 levels using the UP/DOWN arrows. Normally, this will be 400ppm. In larger cities or more congested areas, settings up to 450ppm may be used. Press the ENTER button to confirm your selection.
4. Leave the area and keep people or other CO2 generation sources away from the unit for a minimum of 15 minutes.
5. Return the CHHC-4i to your garden or greenhouse.

Annual Battery Replacement:

For continued optimal performance, it is recommended that the battery for the CHHC-4i be replaced on an annual basis. Use of a high quality CR 2025 button cell battery is required. Please follow proper local disposal procedures for your discarded battery.